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ROYAL BOTANIC GARDENS, KEW.

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XLVII.—A BOTANICAL EXPEDITION TO THE CANARY ISLANDS, 1913.

(With Plates.)

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Our ship left Liverpool on May 17th and called at Madeira on May 22nd, when we took the opportunity of ascending the mountain railway at Funchal to its present terminus, which is situated about 2600 ft. above sea level. The ascent occupied about half-an-hour, the lower part of the track traversing much-terraced hillsides, on which were grown small patches of sugar-cane and vines, numerous fruit-trees such as peaches and loquats, and a great variety of tropical and subtropical trees and shrubs, amongst which the most conspicuous were *Jacaranda acutifolia* (commonly known as *J. mimosaefolia*) and *Wigandia caracasana*.

The subtropical zone of cultivation was succeeded by plantations of *Pinus Pinaster*, which extended upwards to an altitude of about 3400 ft. The cobble-paved mountain road led upwards past the terminus through the pine plantations, and after a time followed the side of a steep ravine. Occasional glimpses were obtained through the trees of the opposite hillside, which in places was yellow with broom.

The undergrowth in the pine plantations consisted chiefly of small bushes of heath (*Erica scoparia*). The white-flowered *Eupatorium adenophorum* was very common by the side of the track in fairly damp places under the shade of the trees, and a singular-looking little herb (*Sibthorpia peregrina*) with long trailing stems, leaves like those of ground-ivy, and pretty yellow flowers, occurred in some abundance on the grassy banks at the side. Specimens of these and a few other plants were collected, and photographs were taken of the head of the ravine, and of the vegetation in the zone above the pine plantations. This consisted principally of a single

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species of tree* which grew gregariously on the ridges and upper slopes of the ravine, and of rounded bright green bushes of *Erica scoparia*, which covered much of the lower slopes (*see* Plate 1). At a bridge across the ravine known as the Ponte da Ribeira Calles, 3500 ft., we had to turn back in order to get down to the town by nightfall.

On our arrival at Santa Cruz, Tenerife, on the morning of May 24th, we found a letter awaiting us from Dr. G. V. Perez suggesting that we should push on to Puerto Orotava. We left Santa Cruz in the afternoon by the electric tram. The country as far as Laguna was much cultivated and had a very burnt-up appearance, and our first impression of Tenerife was rather disappointing, but between Laguna and our immediate destination, Tacoronte, the vegetation was much fresher. The journey occupied about two hours. In the evening we examined the vegetation of a small deep and narrow gully.

Next morning we started off at 6 a.m. to the celebrated wood of Agua Garcia, which we reached about 6.45 Near the bottom of a small ravine were fine trees of the Viñátigo (*Phoebe indica*) with very stout trunks, and good examples of the large-leaved Canarian holly (*Ilex platyphylla*). Several beautiful herbaceous plants were in full flower, including *Ranunculus cortusaefolius*, *Geranium anemonifolium* and a pink-flowered Labiate (*Cedronella canariensis*) On the ridges and the higher parts of the slopes were fine specimens of the tree-heath (*Erica arborea*) and the small-leaved holly (*Ilex canariensis*). *Viburnum rugosum* was seen both in flower and fruit; it is a shrub 5 ft. high or more, and forms a large part of the undergrowth in both the damper and drier parts of the wood. Among the climbers were a *Rubus* which ascended the trees of the Viñátigo to a height of about 40 ft., and a *Smilax* which occurred among the tree-heaths and small-leaved hollies in the upper and drier parts.† After breakfast, we took the first motor-bus to Orotava, where we arrived about 10.30.

There we were met by Dr. Perez, who was accompanied by Domingo Hernandez, seed-collector for Messrs. Wildpret Bros. The remainder of the morning was spent under their guidance, seeing the grounds of the Grand Hotel Taoro (formerly Hotel Humboldt), and an interesting garden belonging to Mrs. Wethered, where many endemic Canarian plants are cultivated. On a lava stream alongside there were fine examples of *Sonchus leptocephalus*, which is remarkable for its extremely dissected leaves. The habit is shown in Schröter, Nach den Canarischen Inseln, plate 10, fig. 2.

In the afternoon a visit was paid to Dr. Perez's garden at Puerto Orotava. Among the more noteworthy plants seen were various species and hybrids of *Statice*, *Echium simplex*, *E. Bourgaeanum*, *E. Pininana*, *E. fastuosum* and *E. candicans*, young Dragon-trees, various critical forms of *Cytisus*, *Retama monosperma* and *R. rhodorhizoides*, *Convolvulus floridus* and an arborescent *Sonchus*.

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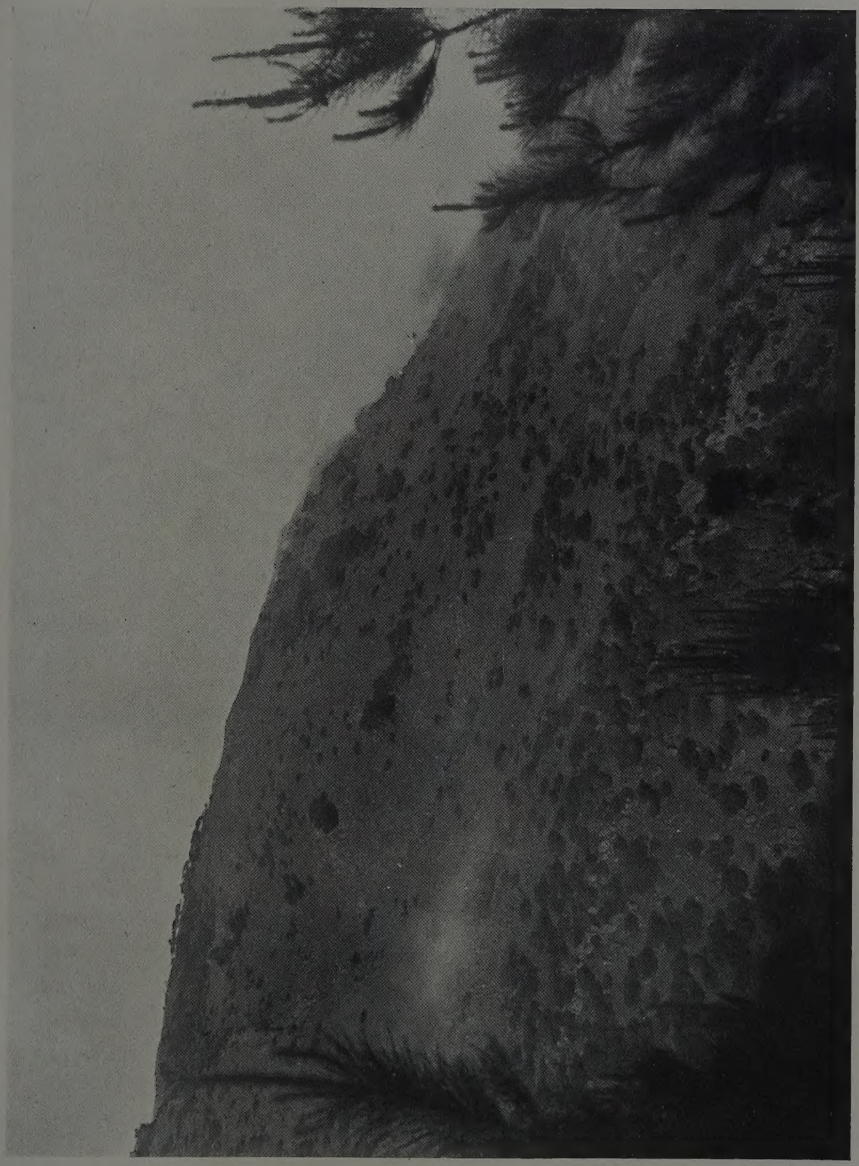
* Not identified, as owing to lack of time we were unable to climb up the hillside to where the trees grew.

† An interesting account of the wood at Agua Garcia is given by M. Emile Jahandiez in the Bulletin du Chêne, 1913; and it is also dealt with by Schenck, Veg. Canar. Ins. p. 316.



ERICA SCOPARIA.

[*To face page* 288.

FICUS ROXBURGHII.

To face page 289.]

Afterwards we went to Los Frailes, a tract of lava country belonging to Dr. Perez. Among the more interesting plants collected were a boraginaceous plant with small white flowers (*Messerschmidia fruticosa*), *Withania aristata* and *Periploca laevigata*. *Rubia fruticosa* was abundant everywhere. Tangled masses of dodder were found on ivy-leaved *Pelargonium*, growing so thickly that it could be gathered in handfuls. There is a fine avenue of the Canarian date-palm (*Phoenix canariensis*) on the estate.

An early start was made next day (May 26th) in company with Domingo Hernandez for the lava stream below the Montaña de la Horca. *Davallia canariensis* was very abundant among the blocks of lava, and another fern, *Gymnogramme leptophylla*, was fairly frequent. Schimper's 'tufted-leaved plants' (Federbusch Gewächse)* were represented by *Kleinia neriifolia* and *Euphorbia Regis-Jubae*. Among other characteristic plants were *Rhamnus crenulata*, *Gonospermum fruticosum*, *Artemisia argentea*, *Lavandula abrotanoides* and a fine white-flowered *Sempervivum*. Flowering and fruiting specimens were obtained of the rare *Ruta pinnata*.

A visit was next paid to the Botanic Garden,† where we were cordially received by the Curator, Señor Juan Bolinaga, by whose exertions many additional plants have been introduced to the Garden in recent years. A special article would be required to do justice to the Botanic Garden: many tropical and subtropical ornamental and economic trees are now in cultivation, and some of the more interesting endemic plants are represented. Fine examples were seen of *Pandanus utilis*, numerous palms, several species of *Araucaria*, *Hibiscus elatus*, 45 ft. high, *Hibiscus rosa-sinensis*, 15 ft., covered with scarlet flowers, *Ficus nitida* and *F. Roxburghii*. The latter is remarkable for producing figs on the trunk right down to the level of the soil, as well as on the large branches (*see* Plate 2). Perhaps the most beautiful thing seen was a tree of *Albizzia Julibrissin* with a wealth of delicate flesh-coloured flowers.

On leaving the Botanic Garden we met Dr. Perez, who drove us up to his garden at Villa Orotava, stopping at the Plaza de Frankei on the way. Here we got specimens of the rare *Rhamnus glandulosus*, which was stated to have been brought from Las Mercedes. The frequent use of native trees is a praiseworthy feature of the public gardens in the Canaries.

There are two interesting groups of *Laurus canariensis* in the garden at Villa Orotava which illustrate the vegetative mode of reproduction of the species: one consists of the base of a large trunk surrounded by a circle of five smaller trees which evidently arose as suckers from the central one; the other has several relatively small trees in a circle, the middle one having completely disappeared. Among other trees seen were *Juniperus Cedrus* ♂ and ♀, *Heberdenia excelsa* and *Arbutus canariensis*. There was a fine bush of *Cytisus Spachianus* 15 ft. high, said by the late

* Schenck, Veg. Canar. Ins., p. 271.

† An interesting account of this Garden was given by Sir D. (then Dr.) Morris in Journ. Roy. Hort. Soc., 1896, vol. xix., p. 78, with a select list (p. 107) of the plants observed there in 1893.

Mr. Hermann Wildpret to have come from the wood at Agua Garcia and distributed by him as *C. Hillebrandii.*

In the afternoon we inspected the "Hijuela" garden, the full name of which is 'Servicio Agronomico Nacional, Hijuela del Botanico.' This contains a great variety of subtropical trees and shrubs maintained in a very healthy condition, including *Corynocarpus laevigata*, *Maclura aurantiaca*, *Sterculia platanifolia*, *Cocculus laurifolius*, *Fabiana imbricata* and a fine example of *Quillaja saponaria.* There was a beautiful specimen of *Fuchsia arborescens* in full flower looking almost exactly like a lilac at a distance, hence its other name *Fuchsia syringaeflora.* Two varieties of the bushy *Fuchsia corymbiflora* were cultivated, one with crimson flowers, the other crimson and white.

In the evening Dr. Perez drove us down to Puerto Orotava and pointed out some features of interest such as an old wine-press with a massive beam of the téa wood (heart-wood of *Pinus canariensis*), which is almost imperishable ; large logs are no longer obtainable locally in Tenerife. In a garden beside the road were some plants of *Lotus peliorhynchus* (Bot. Mag. t. 6733), which had apparently disappeared as a wild plant and was for a long time known only in a garden at Orotava ; it was subsequently rediscovered in the south of the island. The low volcanic hill of the Montaña de la Horca (Gallows Mountain) was covered with a striking association of the Vinagrera, *Rumex Lunaria*, a large shrubby dock.

The well-known fodder plant, Tagasaste (*Cytisus proliferus*) was extensively cultivated on the lower slopes (see *K. B.* 1891, 239 ; 1893 115). It should be treated like an osier, *i.e.*, cut back regularly so as to produce plenty of young shoots and at the same time prevent its growing into a tree. The low growth is the result of pruning and not a varietal character as supposed by Schröter (Nach den Canarischen Inseln, p. 65). The comparative failure of Tagasaste as a fodder-plant in the colonies is attributed by Dr. Perez to improper treatment, the bushes being allowed to become arborescent. Horses generally refuse it at first, but can easily be taught to like it. The Algarrobo, *Ceratonia Siliqua*, is much cultivated, and is seen here and there along the roadside.

On May 27th a banana plantation in the neighbourhood was visited. The species grown in the Canaries is the dwarf *Musa Cavendishii.* The area under cultivation has increased enormously in recent years, and very high rents are paid for suitable land. Irrigation is essential, and is the largest item in the cost of production. In the plantation visited the bunches of fruit were propped away from the stem by small pieces of bamboo to prevent the bananas being deformed by pressure and to ensure freer circulation of air, thus reducing the danger of attack by mould. Each bunch (*racimo*) bore from 12 to 14 hands (*manos*). There were as many as 40 bananas in a lower hand, the number per hand decreasing gradually towards the end of the bunch. An average bunch contained about 400 fruits. One bunch was observed immersed in a pool of water, and on enquiry it appeared that the fruits had shrivelled somewhat, and were being freshened up before delivery to the exporters.

We were delighted to see the island of La Palma* in the evening, outlined against the setting sun. It is only visible from Orotava at sunset during very clear weather.

The unusually clear weather continued on the following day (May 28th), the Peak† being visible at intervals during the morning. As a rule it becomes shrouded by mists about 8 o'clock in the morning, and these usually do not disappear until dusk. They are caused by the rise of moisture-laden sea-breezes which, at an altitude of about 3000 ft., become cooled down sufficiently to cause condensation.

A small steamer lay off the pier awaiting a shipment of bananas, which were being brought down in large wagons drawn by two oxen. The bananas are packed in single and double crates holding one and two bunches respectively. The wood is sent in ready-shaped pieces from Scandinavia, and the crates are made up on the spot. One wagon contained 36 single and 12 double crates, *i.e.*, 60 bunches of bananas altogether.

In the afternoon specimens of a few Canarian trees and shrubs were obtained in Mrs. Wethered's garden by kind permission of the owner. Several of these were afterwards met with in a wild state in La Palma and Tenerife. A few plants were gathered in the Barranco Martianes, the flora of which seemed to be very poor.

On May 29th we left Orotava by the 7 a.m. motor 'bus for Tacoronte, and thence proceeded by tram to Santa Cruz. Between Tacoronte and Laguna there is a fine view towards Tejina, with some good rock scenery. Shortly afterwards, the wooded hills of Las Mercedes came into view, with a table-topped hill in the foreground. These were visited on our return from La Palma, and are described later on. The journey by electric tram from Laguna to Santa Cruz is very bumpy and dusty, at least in the summer, but in the descent to the capital there are fine views of the sharp black peaks and serrated ridges of the Anaga Mountains.

In the afternoon we were courteously received by Don Arturo Ballester, Chief of the Forest Department of the Canaries, to whom we had a letter of introduction. He gave us a letter to the Assistant Conservator of Forests at Santa Cruz de La Palma, and some valuable advice as to places worth visiting in that island.

Our steamer, the "La Palma," was due to leave Tenerife at 8 p.m., but did not depart till after midnight, as there was still a good deal of cargo to be unloaded, including many crates of onions from Lanzarote. On approaching the island of La Palma next morning (May 30th), we could see that the upper and middle slopes of the mountains were still covered with extensive pine-forests. Deforestation has taken place to a much less extent than in Tenerife. The numerous immensely deep ravines (*barrancos*) which furrowed the sides of the mountains were very conspicuous from the sea.

The island is roughly pear-shaped, with the rounded end towards the north. It is 29 miles long and 17¼ miles broad. The centre of the northern half is occupied by an immense crater, the Gran

* Not to be confused with the town of Las Palmas, the capital of Grand Canary.

† Pico de Teyde, Tenerife.

Caldera, which is over 4 miles in diameter and 5000–6000 ft. deep. This is drained by a deep ravine, the Barranco de las Angustias, which runs in a south-westerly direction to the sea. From the rim of the crater, the highest point of which is about 7700 ft., the surface slopes steeply to the sea on the west, north and east. A high mountain ridge runs from the south-east of the crater to the south of the island.

The capital, Santa Cruz, almost always called "La Ciudad" (the city) by the inhabitants, lies at the side of a coast crater, the Caldereta, 1000 ft. deep, half of which has been washed away by the sea. As we came near to land a gentle drizzle started which continued all day. We were told that rain usually ceases in La Palma before the end of May, and not a drop fell during the remainder of our visit.

In the afternoon we called on Dr. Elias Santos y Abreu, the Director of the Museum, and one of the principal doctors of the island, to whom we had a letter of introduction from Dr. Perez.

The town-hall of Santa Cruz is very interesting. It contains the standard of the Spanish Conquest, and the ancient official manuscript records, which are much worm-eaten, and date from 1554, in which year the previous town-hall was destroyed by fire. The remains of the latter are to be seen behind the present building. A curious oven used for baking bread was noticed high up on the outside wall of a neighbouring house.

A visit was also paid to the museum, where we were cordially received by the officials, and the members of the Cosmological Society. There is a fine collection of articles used by the Guanches, the ancient inhabitants of the Canaries. Among them are numerous earthenware cooking pots elaborately ornamented outside, each vessel having a different pattern; drinking cups, milk-bowls, bone needles, a stone knife, curious hats made of rushes, and necklaces of earthenware beads and of seeds. A collection of dried specimens of La Palma plants is being formed under the direction of Dr. Santos, who devotes to scientific pursuits the leisure of a busy professional life.

A huge crab which was fished up off the island from a depth of 160 fathoms measured 3 ft. across as mounted, and 4½ ft. when fully extended.

On May 31st and June 1st a thorough exploration was made of the lower and middle parts of the Barranco del Carmen, a large ravine to the north of the town.

Nearly 60 numbers of plants were gathered, and five photographs were taken illustrating the vegetation. At the mouth of the barranco there was a very characteristic association of tufted-leaved Euphorbias, *Kleinia neriifolia*, *Lavandula abrotanoides*, low rounded greyish bushes something like wormwood (*Schizogyne sericea*) and straggling plants of *Rubia fruticosa*.

On the upper part of the cliffs there was a good deal of the candelabra-like *Euphorbia* (*E. canariensis*), and the Pitera, *Agave americana*, was frequent on the steep hill-sides. Some of the most interesting plants, such as the endemic *Crassulaceae* and *Caryophyllaceae*, grew in the clefts of the perpendicular rock faces.

In the winter there are sudden rushes of water following heavy rains in the mountains, but the barranco is dry for the greater part of the year. In the dry bed of the winter torrent the following plants occur abundantly: tufted-leaved Euphorbias and Kleinias, the white-flowered *Eupatorium adenophorum*, so common in Madeira, *Rumex Lunaria*, a large-leaved *Hypericum*, a *Micromeria* and the common tropical weed, *Bidens pilosa*. A good deal of the bottom of the barranco had formerly been under cultivation, and was now overrun with a yellow-flowered crucifer, *Hirschfeldia adpressa*.

The first specimens of *Pinus canariensis* were seen in the middle part of the barranco, where they descend much nearer the sea than on the ridges. In former times the pines probably extended in many places down to the coast. A small prickly-fruited umbellifer was very abundant on flat ground above the dry bed of the torrent.

We ascended the steep southern slope of the barranco, and returned to the town by the high ground. A pretty much-branched *Sempervivum* grew on the slope. It had white flowers with pink carpels, and a strong smell of honey.

Two days, June 2nd and 3rd, were spent in exploring the lovely Barranco del Rio, which runs into the mountains to the west of the town. On the way we passed the Alameda, a rectangular promenade surrounded by a wall, and shaded by about 30 trees of *Ficus nitida* in four rows, and a few Casuarinas at the far end. Some of the fig trees were blown down in a storm a few years ago and broke down a large part of the wall.

Just past the Alameda is a stone ship, which is rigged in April every fifth year, on the occasion of the festival of the Virgen de las Nieves. The church of that name is situated about one hour's walk up the barranco, and contains an ancient and much venerated image which is carried down to the town in procession during the festival. The altar is overlaid with beaten silver work, among the subjects represented on the panels being a palm, a pine tree, an olive-tree, a banana plant, a tower and a fountain.

The last house passed before entering the Barranco del Rio is situated at about 1000 ft. above sea-level on the ridge to the north, and belongs to Señor Antonio Lopez Anca, who received us very kindly, and made arrangements for a guide to accompany us on the second day.

Señor Anca cultivates a certain amount of coffee for which he obtains 2 pesetas (about 1*s.* 6*d.*) per lb., whilst Venezuelan coffee realises only 1½ pesetas in the island.

The path follows a small aqueduct which has been built along the steep and sometimes precipitous side of the ravine, and one has to walk on the small outer wall, which in places is only 1 ft. wide.

The Barranco del Rio is much moister than the Barranco del Carmen, and the vegetation is very luxuriant. The Canary pine is extremely abundant and extends in places from top to bottom of the slopes. The precipitous rock-faces bear a characteristic association composed largely of *Sempervivum*, and including arborescent Sonchi, Cinerarias and other Compositae, *Phyllis Nobla*, *Sisymbrium millefolium* and a small-flowered *Echium*.

In the damper situations there was a great deal of a pale magenta *Cineraria* which had been much eaten by goats. By the side of the

aqueduct were several small species of *Sempervivum*, abundance of the golden-flowered *Sisymbrium millefolium*, *Arabis albida*, maiden-hair fern and a *Myosotis*.

Among the commonest shrubs and small trees are the Faya (*Myrica Faya*), the small-leaved holly (*Ilex canariensis*) and the tree-heath. There are three kinds of laurels, the most frequent being the Viñátigo (*Phoebe indica*). Among the less common trees are *Visnea mocanera*, *Catha cassinoides* and *Notelaea excelsa*.

We penetrated the ravine to a short distance beyond a hill named Lomo Corto, 2200 ft., and had a fine view of the cliffs known as La Subaquera.

On June 4th we started at 5 a.m. for the Pico del Cedro, 7300 ft. Most of the ascent was done on mule-back, but it was necessary to walk down the greater part of the way. A great extent of low wood was traversed which reached its fullest development between 3000 and 4000 ft., in the cloud belt. The wood was composed mainly of *Myrica Faya*, *Erica arborea* and *Ilex canariensis*, with undergrowth of white-flowered *Cistus* and bracken. The *Ilex* apparently did not occur above 4000 ft., but the *Myrica* was abundant up to 4400 ft., and odd specimens were seen up to 5400 ft. At 8 o'clock we reached the Llano de las Vacas, and had a fine view of the Peak of Tenerife and the wall of cliffs which encircles it above a sea of clouds. About 4700 ft. the vegetation consisted chiefly of pines, tree-heaths and bracken. The upper ridges were clothed with pine woods practically destitute of ground vegetation.

Lunch was taken at the Pozos de la Nieve, 6400 ft., small pits in which snow is stored for summer use. The mules were left here, and the rest of the ascent was done on foot. The last pines occur about 200 ft. below the summit. Above them the chief feature of the vegetation is the Codeso (*Adenocarpus viscosus*), a large papilionaceous shrub with bright yellow flowers.

The Pico del Cedro takes its name from an old cedar (*Juniperus Cedrus*), which formerly grew among the rocks at the summit. This is now dead, but part of the trunk still remains. About 200 ft. below, on the inner slope of the crater, there is a healthy and well-grown example of the same species. It took a quarter-of-an-hour to climb down to it, as much of the surface is composed of dangerous screes, some of which end in small cliffs.

Magnificent views of the crater (Gran Caldera) were obtained. The opposite rim is about four miles away and the bottom is from 5000 to 6000 ft. below. The interior of the crater has been carved by water into an intricate series of steep ravines and bold bluffs, clad with forests of *Pinus canariensis*.

As some difficulty had been experienced in reaching plants on the cliffs, we had a large hook-knife made and mounted on the end of a long pole which proved of considerable service.

On the afternoon of June 6th we examined the vegetation of the sea-cliffs to the south of the town. The beach was composed of black volcanic sand in which nothing grew. At the base of the cliff, among loose boulders and stones which had fallen from it, were a Pellitory (*Parietaria*), *Chrysanthemum frutescens*, a

Micromeria, a much-branched shrubby *Plantago* and a purplish-flowered grass (*Pennisetum cenchroides*).

Nicotiana glauca, a slender shrub with glaucous leaves and greenish-yellow tubular flowers, was abundant amongst the rocks and also in the cuttings of the carriage road which leads round the south of the island. It is a native of South America, which has become completely naturalised in stony places near the sea in the Canaries and the Mediterranean region.

We had hoped to start on the morning of June 7th for Los Llanos, a town on the west of the island, but were prevented from leaving until the 9th. In the meantime a visit was paid to a banana plantation at an altitude of 800 ft. near the village of Las Nieves. It had been neglected, and had fallen into a bad state, but was being improved by the present owners. Two diseases were prevalent, a mould (hongo) and a red scale-insect (mangra). In order to prevent the spread of the mould the perianths were removed after the fruit had set, and the terminal part of the inflorescence, which never produces fruit, was cut off. The large red bracts covering the hands were also removed. To combat the scale-insect, the plants were painted with an emulsion of paraffin and ordinary soap, as soft soap was unobtainable.

Each banana plant in the plantation is irrigated every ten days, alternate days being devoted entirely to this work. After bearing, the stems are cut off about two feet above the ground, and are fed to oxen, the dry leaves being used for packing. Only one sucker is left to replace the old stem, the stump of which remains in the ground for a year, and is then uprooted, broken up and used as manure. The suckers take a year or more to come into bearing, and the bunch of fruit is ready for cutting about five months after the first bracts open. The bunches of bananas are packed first of all in cotton wool, then in newspaper, afterwards in straw, and finally wrapped in dry banana leaves, the whole being rammed tight before the crate is fastened up.

We left Santa Cruz for Los Llanos by the public motor on the afternoon of June 9th. The road zigzags repeatedly up the hillside behind the town until it reaches Buena Vista, 1100 ft., whence it runs straight to the south of the island. The principal crops between 1000 and 2000 ft. appeared to be onions, vines, maize and bearded wheat, and there were numerous mulberry trees and figs.

An interesting plant-association was observed at a place about 1200 ft. above sea-level, where the original vegetation had not been disturbed, bushes of *Myrica Faya* growing amongst such characteristic xerophytes as *Euphorbia obtusifolia* and *Kleinia neriifolia*.

Extensive tracts of lava were passed. These were very bare, and in many places the only plants that could be seen were the Canary pine and the shrubby dock (*Rumex Lunaria*).

Near Fuencaliente at the south of the island we were surprised to see quantities of the yellow Horned-Poppy (*Glaucium luteum*) by the side of the road, at an altitude of 2200 ft., as it is usually regarded as a strictly maritime plant.

We arrived at Los Llanos at 6 o'clock, the journey having occupied three hours. The next day, (June 10th) was occupied

mainly in making arrangements for our journey to the Caldera, but some time was spent in collecting on a lava flow near El Paso.

There are many fields of tobacco in the neighbourhood, and sugar-cane is cultivated close by at Argual. Almond trees are planted everywhere, the produce being sent to Tazacorte for export. Safflower (*Carthamus tinctorius*) is grown in almost all the cottage gardens. The florets, which are used as a dye-stuff, fetch 2 pesetas (1*s.* 6*d.*) per lb. in La Palma.

On June 11th we went on to the farm of Tenerra in the Caldera, accompanied by the Forest Guard at El Paso, Francisco Gonzalez Mendez.

The track to the Caldera leads north from Los Llanos along a small gully, and over dry stony ground to the edge of the Barranco de las Angustias, the great ravine which forms the outlet of the crater. A magnificent blue-flowered thistle (*Cynara Cardunculus*, var. *ferocissima*) occurred by the side of the track and amongst the stones cleared from the fields.

At about 1400 ft. there is a fine view of the ravine, and the path turns sharply to the north-east, rising slightly until a cross is reached marking another good view-point, La Cruz de la Viña, 1600 ft. On the opposite side of the ravine there was a great cliff at the top, with a large terrace at its base, much of which was under cultivation. Below this came a steep slope ending in another cliff which extended nearly to the bottom of the gorge.

The path descends rapidly from La Cruz de la Viña to the river-bed, 800 ft. below, and proceeds for a short distance along the dry flood-bed, before crossing the stream and mounting the opposite slope. Here we observed a number of men cutting branches of *Myrica Faya* for decoration during a fiesta. The first 1000 ft. of the ascent was extremely arduous to those on foot, and took nearly an hour under the blazing sun. After passing the farm (1900 ft.) belonging to Señor Domingo Camacho, the track was rather less steep, but we were glad to make a halt under a fig tree about 400 ft. higher up. A little further, 2400 ft., we passed some bushes of a magnificent pinkish-purple *Salvia*, which we had also observed 1500 ft. below.

At 2600 ft. there were some large rounded bushes of a tansy-like composite (*Gonospermum* sp.), covered with golden-yellow flowers. This also occurred in some quantity higher up, on the slopes of a small ravine, where it formed a distinctive feature of the vegetation.

The highest point on the track is Lomo Alto, 3800 ft., from which there is a slight descent to the farm of Tenerra, which was reached at 12 o'clock. There we were most hospitably received by the owner, Señor Odon Gonzalez Morales, and pitched our tent under a fig tree near the house.

Two days (June 12 and 13) were spent in the Caldera. On the first we went to the small farm of Taburiente, 2800 ft., and collected in the pine-woods on the way. The second day was devoted to exploring the base of the fine cliffs of El Capadero, 2600–2650 ft., where we obtained a rich harvest of plants, including the endemic *Senecio palmensis*, and some photographs of the more characteristic species.

There are five farms in the Caldera (including the Barranco de las Angustias), with a total population of 66 men, women and children. The farms are Taburiente, Tenerra, Camacho, Viña and Paredon.

In the evening after sunset at Tenerra the mists creep up from the direction of the sea into the crater, where they remain all night, retreating down the Barranco de las Angustias before daybreak. The upper level of the mists is apparently about 1000 ft. below Tenerra. The meteorological conditions inside the crater form an interesting contrast with those of the Peak of Tenerife, which is shrouded by mists during the daytime and clear at night.

Our muleteers returned for us on June 14th, and we had a pleasant ride to Los Llanos with occasional stops for collecting and photographing.

The next day one of us returned to Santa Cruz by the Cumbre Vieja, whilst the other went with the luggage by the public motor.

The journey across the Cumbre Vieja, one of the passes over the ridge which forms the backbone of the southern half of the island, was made by mule, starting at 5.30 a.m.

At about 2800 ft. there were numerous pines with an undergrowth of Tagasaste, tree-heath and bracken, and low pine-woods commenced a little below 3000 ft. ' Where the pines had been cut down on the Loma de Andrique, about 3800 ft., the hillside was yellow with bushes of Codeso (*Adenocarpus viscosus*).

At 3850 ft. a desert of black volcanic sand and gravel was entered, parts of which were destitute of vegetation, whilst others had only a sprinkling of burnt-up annuals a few inches high. These included a sorrel, a *Silene*, a rock-rose (*Helianthemum guttatum*), a Composite, two trefoils and two or three grasses. A continuous carpet of vegetation was absent except in a few depressions into which some brown sandy soil had been washed. Towards the top of the pass the black sand was replaced by brown soil, which was covered with a scrub of tree-heath and pink *Cistus* (*C. Berthelotianus*), amongst which were a few pines.

The summit of the pass is about 4700 ft. above sea-level. On the eastern slope there is a good deal of bracken near the top, and at about 4500 ft. the first bush of Faya (*Myrica Faya*) was seen. This rapidly became more plentiful, and at 4400 ft. the track entered a low wood of Faya and tree-heath, which gradually passed into typical laurel-wood. Among the more interesting herbs seen were *Geranium anemonifolium* and *Cedronella canariensis*, the latter not in flower. Two yellow-flowered species of *Sempervivum* were very common on a wall by the side of the track. One of these is known as ' Crespinel ' and its juice is used to cure sores. The track joins the road at Breña Alta, 1200 ft., and the remainder of the journey to Santa Cruz calls for no remark.

We left La Palma on the evening of June 16th, and arrived at Santa Cruz, Tenerife, the next morning. In the afternoon a small ravine behind the Hotel Pino de Oro was explored. This contained an interesting association of xerophilous plants including *Plocama pendula*, *Euphorbia canariensis*, *Kleinia neriifolia* (leafless), *Lavandula abrotanoides*, a *Micromeria* and the wide-spread *Nicotiana*

glauca. The *Plocama* is a small rubiaceous bush with long slender weeping whip-like branches and small white fruits like mistletoe berries.

Next day we started by the first tram (7 a.m.) for Laguna, and walked from there to the woods of Las Mercedes. There was a good deal of the fragrant yellow-flowered *Spartium junceum* on the way.

The track to the wood leaves the road at the village of Las Mercedes, and ascends the side of a dry hill, passing some rock dwellings on the way. These are hewn out with pick-axes, and are lime-washed inside. The Guanches, who inhabited the Canaries before the Spanish Conquest, lived mostly in caves, and the custom has persisted to the present day. The best known cave-dwellings are those of Atalaya in Grand Canary.

A fine *Sempervivum* with greenish-white flowers was fairly common on the dry stony hill-side, and there was a good deal of a shrubby plantain (*Plantago arborescens*), which formed much-branched bushes 1½ ft. high. *Daphne Gnidium* occurred both on the dry hill-side and in outlying parts of the wood.

The wood commenced at an altitude of about 2600 ft., and extended to the tops of the hills, which were about 3000 ft. high. *Prunus lusitanica* occurred in great abundance, and was in flower at the time of our visit. It has an interesting geographical distribution, being known only from Portugal, the Azores, Madeira and Tenerife. A lovely gentianaceous plant, *Ixanthus viscosus*, grew in rich soil on the shady slopes. It is a slender little-branched herb, 4–5 ft. high, with a large terminal pyramidal panicle of bright yellow flowers, and has somewhat the appearance of a *Lysimachia*. Among the climbers was the beautiful mauve-flowered *Convolvulus canariensis*, which ascends to the top of the trees, where it produces dense masses of flowers. The stems of old plants become very corky, and one that we measured was 12 inches in circumference at the base. A pretty *Senecio* (*S. appendiculatus*) with white ray and buff-coloured centre was very common in the wood. Forty-five numbers of plants were collected during the day, and photographs were taken of some of the more characteristic species.

We left for England on the evening of the following day (June 19th), and arrived at Southampton on June 27th.

Over six hundred numbers of plants were collected during the expedition, and about fifty photographs were taken. The scientific results will be published elsewhere as soon as the collection has been worked out.

In the meantime we desire to express our hearty thanks to Dr. Thomas Bond Sprague, for generous financial support, without which the expedition could not have been undertaken; to the Director, Royal Botanic Gardens, Kew, for extended leave during our stay in the Canaries; to Dr. George Victor Perez, whose admirable arrangements for our stay in Tenerife and kind assistance in many other ways conduced largely to the success of the expedition; to Messrs. Wildpret Bros., for kindly permitting their seed-collector to act as guide during our visit to Orotava; and to Don

Arturo Ballester, Chief of the Forest Department in the Canaries, and Don Jose Ruiz y Albaya, Assistant Conservator in La Palma, for their courtesy in affording us all facilities in their power during our stay in La Palma.

XLVIII.—DIAGNOSES AFRICANAE.—LV.

1451. **Pelargonium luteolum**, *N. E. Brown* [Geraniaceae-Pelargonieae]; affinis *P. rapaceo*, Jacq., sed foliis biternatim divisis et petalis 3 inferioribus porrectis subimbricatis nec conniventibus facile distinguitur.

Herba bulbosa. *Folia* 4–5, omnia radicalia; petiolus 4–6 cm. longus, glaber vel minute puberulus; lamina biternatim divisa, 1·5–3 cm. longa et lata, segmentibus ultimis 3–13 mm. longis linearibus acutis. *Pedunculi* erecti, 3–5 cm. longi, inferne 1–2-nodosi, aphylli, minutissime glanduloso-puberuli. *Umbelli* 3–5-flori, basi bracteis 1 mm. longis linearibus apice barbatis involucrati. *Calyx* glanduloso-puberulus; tubus sessilis, 1·3–1·4 cm. longus; lobi 5 mm. longi, lineari-oblongi, acuti, 4 inferiores reflexi, pallide virides. *Petala* 1 cm. longa, spatulata, obtusa, 2 superiora 3 mm. lata, erecto-reflexa, 3 inferiora 4·5 mm. lata, porrecta, subimbricata, omnia pallide flava, basi lineis duobis rubris ornata. *Stamina* perfecta 5; antherae purpureae, polline aurantiaco.

South Africa. Prince Albert Div.; near Prince Albert, *Pearson*.

Described from a living plant sent in 1912 by Prof. Pearson to Kew, where it flowered in June, 1913.

The three lower petals of the flower are horizontally directed forward and the two lateral partly overlap the central one, but stand slightly above it on another plane.

1452. **Bersama transvaalensis**, *Turrill* [Melianthaceae-Melianthae]; *B. Tysonianae*, Oliver, affinis, sed foliolis paucioribus majoribus, racemis longioribus, fructibus dense et obtuse echinatis, facile distinguenda.

Arbor 12-metralis (ex *Thorncroft*), ramis teretibus juventute leviter puberulis, foliorum cicatricibus prominentibus triangularibus. *Folia* imparipinnata, usque ad 20 cm. longa, petiolo 2–4 cm. longo cum rhachi leviter puberulo plus minusve sulcato haud alato; foliola 7–9, ovato- vel elliptico-lanceolata, apice obtusa vel acutiuscula, basi lateralia oblique acuta, terminalia cuneata, margine integra vel leviter et irregulariter dentata, glabra vel costa infra leviter puberula, nervis reticulatis, lateralibus utrinque usque ad 13 cum costa in pagina superiore subprominulis in inferiore prominentibus; foliolorum lateralium petioluli 2 mm. longi, terminalium 5 mm. longi, leviter puberuli; stipulae parvae, intrapetiolares, amplexicaules. *Racemi* multiflori, terminales, 2–3-aggregati, cum pedunculo usque ad 18 cm. longi, dense puberuli; pedunculus usque ad 4 cm. longus; bracteae lineari-lanceolatae, acutae, 4 mm. longae, dense puberulae; pedicelli 4–5 mm. longi. *Calyx* extra dense puberulus, intus fere glaber, coriaceus, lobis 5, postico anguste ovato 5 mm. longo 3 mm. lato, lateralibus linearibus 5 mm. longis

1·5 mm. latis, antico ovato 5 mm. longo 4 mm. lato apice leviter bifido. *Petala* 5, inter se aequalia, recurva, oblongo- vel spathulato-linearia, apice obtusa, usque ad 1 cm. longa et 3 mm. lata, in pagina utraque unguis parte inferiore excepta puberula. *Stamina* 4, filamentis 8 mm. longis inferne latioribus complanatis et puberulis superne subulatis et glabris, antheris 1·5 mm. longis. *Discus* posticus, 1 mm. altus, truncatus, glaber. *Gynoecium* leviter obliquum, 8 mm. altum, 1·5 mm. diametro, adpresse pilosum; stigma globosum, fere 1 mm. diametro. *Fructus* globosus, 2·5 cm. diametro, valvis dorso dense echinatis, processubus triangularibus obtusis.

South Africa: Transvaal, Saddelback Mountain, near Barberton, *Thorncroft* 817.

1453. **Crassula erosula**, *N. E. Brown* [Crassulaceae]; affinis *C. canescenti*, R. & S., sed foliis glabris eciliatis facile distinguitur.

Herba perennis, succulenta, subacaulis vel in cultura internodiis 0·4–2·4 cm. longis. *Folia* opposita, decussata, arcte approximata, patula, carnosa, 1·3–3·5 cm. longa, 7–9 mm. lata, 2·5–7 mm. crassa vel in culturis 2–6 cm. longa, 5–8 mm. lata et 2–5 mm. crassa, sessilia, basi leviter connata, subobovata, lanceolata vel lineari-lanceolata, acuta vel subobtusa, supra plana vel leviter convexa, subtus valde convexa, minute impresso-punctata, glabra, absque ciliis, viridia nec glauca. *Pedunculus* usque ad 21 cm. altus, bractearum sterilium 4 paribus instructus, inferne glaber, ad apicem minutissime puberulus. *Flores* sessiles, in cymas capituliformes 0·8–1 cm. diametro axillares et terminales sessiles vel breviter pedunculatas dense congesti. *Bracteae* folia reducta simulantes, 4–8 mm. longae, lanceolatae, acutae, superiores minutissime subpuberulae. *Sepala* 2·5 mm. longa, lineari-oblonga, subacuta, minute puberula, ciliata, viridia. *Petala* conniventi-erecta, basi breviter connata, 3·5 mm. longa, 1·5–1·8 mm. lata, imbricata, obovata, obtusa, minutissime eroso-denticulata, dorso pone apicem apiculo oblongo crasso-carnoso obtuso instructa, glabra, alba. *Stamina* inclusa, glabra; filamenta alba; antherae luteae. *Glandulae hypogynae* cuneatae, truncatae, aurantiacae. *Carpella* lanceolata, in stylum brevissimum attenuata, glabra.

South Africa. Little Namaqualand; on gravel slopes in Doornpoort Ravine, *Pearson* 6153.

Described from a living plant collected by Prof. Pearson during the Percy Sladen Memorial Expedition to the Orange River in 1910–11 and sent by him to Kew, where it flowered in March, 1912.

1454. **Cotyledon glandulosa**, *N. E. Brown* [Crassulaceae]; affinis *C. glutinosae*, Schönl., sed foliis duplo brevioribus et latioribus subteretibus conspicue mucronatis et pilis minutis glanduloso-capitatis obtectis differt.

Herba perennis, succulenta, ubique (praeter partem corollae interiorem) pilis minutis glanduloso-capitatis conspersa. *Caules* erecti, 4–6 cm. alti, basi vel superne ramosi, 2–3 mm. crassi, apice foliiferi, inferne nudi, brunnei vel rubro-tincti. *Folia* opposita, in paria 3–4 conferta, sessilia, 1–2·5 cm. longa, 5–7 mm. lata, 3–6 mm. crassa, subteretia vel passim clavata, obtusa vel subacuta, distinctissime

mucronata, basi brevissime cuneata vel interdum sublonge attenuata, primum glauco-albida, demum olivaceo-brunnea, apice rubro-marginata. *Pedunculus* terminalis, erectus, 6 cm. longus, 1·5 mm. crassus, apice cymose 4–5-florus. *Bracteae* minutae, caducae. *Pedicelli* 6–7 mm. longi, recurvo-patuli. *Flores* subnutantes. *Calyx* 3 mm. longus, profunde 5-lobus, viridis, rubro-punctatus ; lobi 2 mm. longi et lati, deltoideo-ovati, acuti, subpatuli. *Corollae* tubus 5·5 mm. longus et diametro, cylindricus, sordide viridis, rubro-striato-punctatus ; lobi 1 cm. longi, 3·5–3·75 mm. lati, lanceolati, acuti, recurvo-patentes, extra sordide rubri, intra sordide virides, marginibus sordide rubris. *Stamina* 7–7·5 mm. longa, exserta, glabra ; filamenta filiformia, pallide viridia ; antherae fuscae. *Styli* 5, stamina excedentes, demum recurvi, pallide virides. *Squamae hypogynae* minutae, transverse rectangulares.

Tropical Africa. Northern Rhodesia? without locality, *G. Simpson-Hayward.*

The native habitat of this species is somewhat doubtful. It was among a collection of living plants which were collected by Mr. G. Simpson-Hayward during a cricketing tour in Rhodesia and South Africa and presented by him in 1910 to Kew, where it flowered in June, 1913. Mr. Simpson-Hayward does not remember where he found it, but informs us that "most of the plants were collected in Northern Rhodesia." The species to which it is most nearly allied is, however, a South African plant.

1455. **Hyobanche robusta,** *Schönland* [Scrophulariaceae-Gerardieae] ; affinis *H. sanguineae,* Thunb., sed elatior, sepalo postico libero, corolla subduplo longiore apice acutiore et ore majore bene distinguitur.

Herba parasitica. *Caulis* usque ad 23 cm. longus, 2·5 cm. crassus, carnosus. *Folia* squamiformia, dense imbricata ; inferiora 5–7 mm. longa, orbiculari-ovata, abrupte acuta, carinata, subglabra, fusco-ferruginea ; superiora gradatim longiora, usque ad 3 cm. longa et 1·2 cm. lata, oblonga vel elongato-oblonga, acuta vel obtusa, villoso-tomentosa, dorso ferruginea, cetera albida. *Spica* usque ad 14 cm. longa et 8 cm. lata. *Bracteae* 2–3 cm. longae, 1–1·2 cm. latae, oblongae, obtusae, villoso-tomentosae. *Bracteolae* 2–2·3 cm. longae, 1·5–2 mm. latae, lineares, acutae, villoso-tomentosae, albae. *Sepala* 4–5 cm. longa, villoso-tomentosa, alba ; lateralia per paria ad medium connata, parte connata oblonga 7 mm. lata, parte libera lineari obtusa ; sepalum posticum liberum, lineare. *Corolla* 6 cm. longa, superne 7–8 mm. diametro, procurva, apice subacuta, ore obliquo 2 cm. longo basi unidentato, extra villoso-tomentosa, intra glabra, basi luteola, superne purpurea, apice ferruginea. *Stamina* vix exserta ; filamenta basi pubescentia ; antherae luteo-brunneae. *Ovarium* globosum, glabrum ; stylus apice decurvus, complanato-subclavatus.

South Africa. Humansdorp Div. ; near Humansdorp, *Mrs. Christy* 54.

1456. **Sarcostemma Pearsonii,** *N. E. Brown* [Asclepiadaceae-Cynancheae] ; affinis *S. viminali,* R. Br., sed floribus minoribus, petalis angustioribus contortis luteis et corona omnino diversa differt.

Frutex succulentus, aphyllus, usque ad 30 cm. altus, furcato-ramosus. *Rami* suberecti, teretes, 3–4 mm. crassi, internodiis 2·5–5·5 cm. longis, novellis pilis minutis deciduis puberulis. *Folia* rudimentaria, vix 1 mm. longa, squamiformia, deltoidea, acuta. *Umbellae* terminales, 3–6-florae. *Pedicelli* 3–5 mm. longi, minute puberuli. *Sepala* 2 mm. longa, ovato-lanceolata, acuta, minute puberula. *Petala* 5·5 mm. longa, basi abrupte dilatata et 2·5 mm. lata, superne linearia, obtusa, 1·3 mm. lata, contorta, glabra, lutea. *Coronae exterioris* lobi lateribus loborum coronae interioris connexi, breves, poculiformes, bidentati, glabri. *Coronae interioris* lobi 1 mm. longi, suberecti, deltoideo-ovati, acuti, dorso transverse gibbosi, apice breviter bifido styli breviores.

South Africa. Great Namaqualand: Great Karasberg Range; on stony plains south-west of Krai Kluft, 1600 m. alt. *Pearson* 8460.

1457. **Xysmalobium Stocksii**, *N. E. Brown* [Asclepiadaceae-Cynancheae]; affinis *X. Heudelotiano*, Decne., sed foliis lineari-lanceolatis acutis duplo longioribus, floribus majoribus, coronae lobis lanceolatis facie interiore gibboso-carinatis (nec cornibus instructis) differt.

Herba perennis. *Radix* tuberosa. *Caulis* erectus, 45–55 cm. altus, simplex, unifariam puberulus. *Folia* opposita, sessilia, inferiora 12–16 cm. longa, 0·7–1·1 cm. lata, superiora gradatim minora, lineari-lanceolata, acuta, basi angustata, glabra. *Umbellae* omnes sessiles, 4–7-florae. *Pedicelli* 0·8–1·2 cm. longi, unifariam puberuli. *Sepala* 4–6 mm. longa, anguste lanceolata, acuminata, glabra. *Corolla* reflexa, fere ad basin 5-loba, utrinque glabra; lobi 5–6 mm. longi, 2·5–3 mm. lati, ovati vel elliptico-lanceolati, acuti, albovirentes (?). *Coronae* lobi 3 mm. longi, fere 1·5 mm. lati, erecto-patuli, lanceolati, obtusi, dorso subplani vel leviter convexi facie interiore prope apicem gibboso-carinati, purpurascentes.

Tropical Africa. Portuguese East Africa; without precise locality, *Stocks*.

1458. **Ceropegia Dalzielii**, *N. E. Brown* [Asclepiadaceae-Ceropegieae]; affinis *C. campanulatae*, Don, sed foliorum marginibus costisque glabris et floribus fere duplo majoribus differt.

Herba perennis, tuberosa. *Tuber* parvum, subglobosum vel ovoideo-discoideum. *Caulis* erectus, simplex, circa 36 cm. altus, 2 mm. crassus, tenuiter et minute puberulus. *Folia* superiora 5–8 cm. longa, 2–3 mm. lata, linearia, acuta, inferiora gradatim minora, glabra. *Flores* pauci, solitarii, ad nodos laterales et terminales, erecti. *Pedunculi* 1·5 cm. longi, puberuli. *Sepala* 4–5 mm. longa, attenuato-subulata, subpuberula. *Corollae* tubus rectus, 4 cm. longus, basi inflatus, medio cylindricus, apice late infundibuliformis et circa 2 cm. diametro, extra glaber, inferne purpureus, superne virescens: lobi 4 cm. longi, erecti, leviter incurvati et apice connati, e basi late deltoidei anguste lineares, replicati, intra sublanato-pilosi, virides vel olivaceo-virides ut videtur.

Tropical Africa. Northern Nigeria: at Abinsi, only a single specimen found, June 15, 1912, *Dalziel* 689.

Neither the interior of the corolla-tube nor the corona of this species can be described, as the only flower upon the specimen has been so much flattened in pressing that it will not admit of examination.

1459. **Ceropegia Patersoniae**, *N. E. Brown* [Asclepiadaceae-Ceropegieae]; affinis *C. Zeyheri*, Schlechter, sed floribus solitariis multo longioribus et corollae tubo glabro differt.

Caulis succulentus, volubilis, 3 mm. crassus, glaber. *Folia* perparva, sessilia, patula, 4–8 mm. longa, 1·5–2 mm. lata, lanceolata, acuta, glabra, succulenta. *Flores* ad nodos laterales, solitarii. *Pedicelli* 6–8 mm. longi, 1·5 mm. crassi, glabri. *Sepala* 5 mm. longa, lanceolato-attenuata, glabra. *Corollae* tubus 2·2–2·5 cm. longus, basi inflatus, extra intraque glaber, basi intra purpureo-punctatus; lobi 2–2·3 cm. longi, erecti, leviter curvati (?), apice connati, lineari-filiformes, basi utrinque breviter villoso-pubescentes, superne intra minute pubescentes. *Coronae exterioris* lobi fere ad basin bifidi, glabri, segmentis 2 mm. longis subulatis erectis. *Coronae interioris* lobi erecto-conniventes, 2·5 mm. longi, lineares, glabri.

South Africa. Uitenhage Div.; near Redhouse, *Mrs. T. V. Paterson* 210.

Described from a specimen preserved in fluid, received from Dr. S. Schönland in July 1913.

1460. **Ceropegia Schoenlandii**, *N. E. Brown* [Asclepiadaceae-Ceropegicae]; affinis *C. barbertonensi*, N. E. Br., sed petiolis brevioribus, floribus multo minoribus et corollae tubo intra glabro facile distinguitur.

Caulis volubilis, tenuis, 1 mm. crassus, glaber. *Folia* carnosa, subrigida, glabra; petiolus 3-4 mm. longus; lamina 1·2–1·6 cm. longa, 0·9–1·3 cm. lata, ovato-cordata, obtusa, apiculata, subundulata, glabra. *Pedunculi* ad nodos laterales, 1·3–2 cm. longi, demum pluriflori, glabri. *Pedicelli* 3–4 mm. longi, glabri. *Sepala* 1·5 mm. longa, subulata, acuta, glabra. *Corollae* tubus 1·2 cm. longus, vix curvatus, extra intraque omnino glaber, basi globoso-inflatus et purpurascens, supra pallidus, ore leviter dilatato et 4 mm. diametro; lobi erecti, recti, apice connati, 5 mm. longi, late lineares, apice vix vel levissime dilatati, marginibus replicatis, extra glabri, intra pilis tenuissimis purpureis conspersi. *Corona* exterior brevissima, lobis quinque poculiformibus emarginatis, glabra, alba. *Coronae interioris* lobi 1–1·25 mm. longi, conniventi-erecti, apice leviter recurvati, lanceolati, acuti, basi angustati, glabri, albi.

South Africa. Uitenhage Div.; near Redhouse, *Mrs. T. V. Paterson*.

Described from a specimen preserved in fluid, received from Dr. S. Schönland in July 1913.

1461. **Stapelia longipedicellata**, *N. E. Brown* [Asclepiadaceae-Stapelieae]; affinis *S. kwebensi*, N. E. Br., sed pedicellis erectis duplo vel triplo longioribus, corolla minus rugosa et atrata differt.

Caules conferti, erecti (nec basi decumbentes), 10–15 cm. longi, 1–1·5 cm. crassi, tetragoni, minute puberuli, virides; anguli dentati. *Folia* rudimentaria, erecta, lanceolato-subulata, acuta. *Cymae* ex. medio caulorum enatae, 2–4-florae, pedunculatae. *Pedunculi* 8–12, mm. longi, 6 mm. crassi, minute puberuli. *Pedicelli* erecti, 2·5–5 cm, longi, 3 mm. crassi, minute puberuli. *Sepala* patula, 6–7 mm. longa, subulato-lanceolata. *Corolla* 3·8–4·3 cm. diametro, profunde 5-loba extra minutissime puberula; tubus parvus, circa 3 mm. longus

6 mm. diametro, glaber, subpurpureus ; lobi stellatim patentes, 1·6–1·9 cm. longi, 7 mm. lati, quum explanati lanceolati, acuti, convexi, marginibus valde revolutis, intra transversim rugosi, basi glabri, cetera puberuli, subnigri. *Coronae exterioris* lobi minuti, brevissimi, 0·5 mm. longi, 1·5 mm. lati, truncati. *Coronae interioris* lobi lineares, obtusi, antheris incumbentes et eas vix excedentes, sordide purpurei. —*S. kwebensis* var. *longipedicellata*, Berger, Stapelieen und Kleinien, p. 318, fig. 66.

Tropical Africa. German South West Africa, described from a living plant, which flowered at Kew in September, 1912.

This plant was received from Messrs. Haage & Schmidt under the name of *S. kwebensis*, and is undoubtedly the variety *longipedicellata* of Berger. But it distinctly differs from *S. kwebensis* by the more minute pubescence of the stems, much smaller rudimentary leaves, long stout peduncles, the twice as long and erect (not spreading) pedicels and different colour of the flowers. It also comes from a different area.

1462. **Stapelia Pearsonii**, *N. E. Brown* [Asclepiadaceae-Stapelieae]; affinis *S. olivaceae*, N. E. Br., sed pedicellis triplo vel quadruplo longioribus et corolla eciliata subtiliter rugosa facile distinguitur.

Caules erecti, 4–8 cm. longi, 0·6–1·2 cm. crassi, obtuse 4-angulati, lateribus planis vel leviter concavis, minute puberuli, sordide virides vel cinereo-virides, purpureo-brunneo-marmorati; anguli rotundati, haud compressi, vix vel haud dentati. *Folia* rudimentaria, 0·75–1 mm. longa, deltoidea, acuta, erecta. *Pedicelli* 2·5–3·5 cm. longi, minute puberuli, purpurascentes. *Sepala* 3–4 mm. longa, anguste deltoideo-lanceolata, acuta, minute puberula. *Corolla* 3·5 cm. diametro, extra minute puberula, sordide virescens, lobis nervis 3 purpureis ornata, intra glabra, subtiliter rugosa, omnino brunneo-purpurea ; discus subplanus, 1·2 cm. diametro ; lobi stellatim patuli, 1·4 cm. longi, 6–8 mm. lati, lanceolati, acuti, convexi, marginibus recurvis eciliatis. *Coronae exterioris* lobi 4 mm. longi, anguste lineares, obtusi vel acuti, plani, in disco corollae patuli, fusco-purpurei, plus minusve nitidi. *Coronae interioris* lobi bicornuti, fusco-purpurei ; cornua filiformia, exteriora 2·5 mm. longa, recurva, interiora 4 mm. longa, basi conniventia, apicibus recurva.

South Africa. Great Namaqualand; on the Great Karasberg range, among rocks above the camel-path between Narudas Sud and Krai Kluft, 1450–1500 m., *Pearson* 8539.

This species, *S. olivacea*, N. E. Br., and *S. similis*, N. E. Br., so closely resemble one another in their stems and in habit, that when out of flower they are very difficult to discriminate, yet the flowers of all three are quite different.

1463. **Euphorbia Hislopii**, *N. E. Brown* [Euphorbiaceae-Euphorbieae]; species *E. splendenti*, Bojer, simillima, sed caulibus fere duplo crassioribus, foliis sessilibus basi late cuneatis nec attenuatis et pedunculis brevioribus facile distinguitur.

Frutex succulentus, spinosus. *Caules* vel rami (spinis exclusis) 2–2·5 cm. crassi, 8-angulares, glabri, olivaceo-virides vel cinereo-olivacei ; anguli grosse spinoso-dentati, spinis 0·5–1·5 cm. longis brunneis. *Folia* sessilia, 5–9 cm. longa, 1·8–4 cm. lata, lanceolato-oblonga vel anguste elliptica, obtusa vel acuta, basi late cuneata,

glabra, viridia. *Cymae* ad apicem ramorum subsolitariae erectae; pedunculi 1–1·5 cm. longi, 2·3–2·5 mm. crassi. *Bracteae* squamiformes, 2–3 mm. longae, subquadratae vel oblongae, obtusissimae, membranaceae; bracteae florentes 5–6 mm. longae, 0·8–1 cm. latae, transversim ellipticae, obtusissime rotundatae, minute apiculatae, glabrae, pulchre coccineae. *Involucrum* 3·5–4 mm. diametro, campanulatum, glabrum, glandulis 5 transverse ellipticis coccineo-rubris. *Ovarium* breviter stipitatum, inclusum, glabrum; styli e basi liberi, filiformes, 2·5 mm. longi, rubro-coccinei, apice clavati, atro-fusci.

Origin unknown, but probably a native of Madagascar or neighbouring islands, since the species most nearly allied to it all come from there. The above description is made from a plant cultivated at Kew, raised from a cutting brought from the Botanic Garden at Durban by *Mr. A. Hislop* in 1911.

1464. **Anchomanes Dalzielii**, *N. E. Brown* [Aroideae-Pythonieae]; affinis *A. Welwitschii*, Rendle, sed spadice multo longiore et ovario laevi in stylum brevem abrupte contracto differt.

Herba tuberosa. *Folium* solitarium; petiolus 0·6–1 m. longus, spinosus; lamina triramosa; rami 20–38 cm. longi, 15–45 cm. lati, ad medium furcati, pinnatisecti, glabri, segmentis inferioribus late ovatis vel obliquis acutis vel acuminatis terminalibus cuneatis vel cuneato-oblongis bicuspidatis. *Pedunculi* elongati, spinosi. *Spatha* 20–22 cm. longa, basi convoluta, superne concavo-lanceolata, acuta, glabra, alba. *Spadix* 13–15 cm. longus, 1·5 cm. crassus, cylindricus, obtusus, parte feminea 2–3 cm. longa. *Ovarium* oblongum vel obovato-oblongum, apice subtruncatum, in stylum 1 mm. longum abrupte contractum, laeve.

Tropical Africa. Northern Nigeria; Kontagora Province, *Dalziel* 563.

1465. **Gladiolus Masoniorum**, *C. H. Wright* [Iridaceae-Ixieae]; ex affinitate *G. sulphurei*, de Graaf, a qua lobis perianthii brevioribus spathisque acuminatis differt.

Folia 5·3 dm. longa, 1 cm. lata, basi apiceque attenuata, utrinque hirsuta, costa crassa, nervis marginalibus validis. *Racemus* 30 cm. longus, glaber; spathae herbaceae, glabrae, exterior lanceolata, acuminata, 3·5 cm. longa, 1·2 cm. lata, interior minor, 3 cm. longa. *Perianthium* cremeum, ad faucem pallide luteum, intra tubum viride; tubus 2 cm. longus, anguste infundibuliformis; lobi 5 superiores subaequales, 3 cm. longi, 2 cm. lati, obtusi, undulati; lobus inferior 1·5 cm. latus. *Antherae* cremeae. *Stigmatis* lobi spatulati, 3 mm. longi.

South Africa. Described from a plant which flowered in the Cambridge University Botanic Garden in May, 1913, from material collected in Tembuland by *Canon G. E.* and *Miss M. H. Mason.*

1466. **Moraea revoluta**, *C. H. Wright* [Iridaceae-Moraeeae]; *M. spathaceae*, Ker, affinis, floribus solitariis, sepalis revolutis stylique cristis differt.

Cormus 2·5 cm. diametro, tunicis brunneis reticulatis vestitus. *Caulis* lateralis. *Folia* circa 3, 7·5 dm. longa, 1 cm. lata, rigida, crassiuscula, glabra, acuminata, convexa, anguste canaliculata.

Scapus 35 cm. altus, cylindricus; spathae valvae 10 cm. longae, acuminatae, rubro-brunneae tinctae; pedicelli 9 cm. longi. *Sepala* 5·5 cm. longa, 1·2 cm. lata, oblonga, obtusa, revoluta, extus brunneo-purpurea tincta, intus in parte superiore lineis divergentibus brunneis vittata. *Petala* oblanceolata, obtusa, 6 cm. longa, 1·2 cm. lata, lucide lutea. *Antherae* luteae. *Styli* rami 3·5 cm. longi, lutei, brunneo-tincti; cristae 2 cm. longae, alte bipartitae, irregulariter undulatae, lobis subcruciatim impositis. *Ovarium* glabrum, oblongum, rubro-brunneum, 3 cm. longum, 4 mm. diametro.

Tropical Africa. Angola, at the top of ridges in dry soil. The corms were collected in Angola and sent to Kew by *Mrs. F. Douglas Fox*. They flowered in August, 1913.

The crossing of the style-crests, like the tips of the closed wings of some birds, forms a characteristic feature of the flower.

1467. **Sansevieria bagamoyensis**, *N. E. Brown* [Liliaceae-Dracaeneae]; species distinctissima, fruticosa vel suffruticosa, caulibus erectis foliis quoquoversis recurvato-patulis et floribus paniculatis.

Frutex vel *suffrutex*, caulibus erectis folosis. *Folia* quoquoversa, recurvato-patula, 17–38 cm. longa, usque ad 1·3 cm. lata, linearia vel lineari-lanceolata, attenuato-acuta, concavo-canaliculata, angustissime rubromarginata. *Panicula* 40 cm. longa et 25 cm. diametro, ramis 6·5–20 cm. longis. *Fasciculi* 2–4-flori. *Pedicelli* in fructu 5 mm. longi, medio articulati. *Flores* parvi; tubus 5 mm. longus, angustus; lobi 6 mm. longi, lineares.

Tropical Africa. German East Africa; near Bagamoyo, *Sacleux* 672.

1468. **Sansevieria abyssinica**, *N. E. Brown* [Liliaceae-Dracaeneae]; affinis *S. metallicae*, Gér. et Labr., sed foliis crassioribus rubro-marginatis epidermide rugosa facile distinguitur.

Herba succulenta, acaulis. *Folia* 60 cm. vel ultra longa, 6–7·5 cm. lata, lanceolata, acuta, basi in petiolum concavo-canaliculatum attenuata; epidermis minute sed distinctissime rugosa. *Racemus* cum pedunculo 67–75 cm. longus. *Fasciculi* 4–5-flori. *Pedicelli* in fructu 6–8 mm. longi, medio articulati. *Flores* non vidi. *Baccae* 0·7–1·3 cm. diametro.

Abyssinia. On mountains near Jana, 1300–1500 m., *Schimper* 1468.

1469. **Sansevieria conspicua**, *N. E. Brown* [Liliaceae-Dracaeneae]; affinis *S. Dawei*, Stapf, sed foliis brevioribus subsessilibus et floribus multo majoribus differt.

Herba acaulis. *Folia* 3–5 in fasciculum aggregata, 22–60 cm. longa, 5–8 cm. lata, lanceolata, acuta, apice indurata, basi angustata, vix petiolata, utrinque viridia, supra atro-lineata, subtus obscure fasciata, marginibus rufo-brunneis. *Inflorescentia* racemosa, 45–50 cm. alta. *Flores* fasciculati. *Fasciculi* 2–3-flori. *Pedicelli* 4–6 mm. longi, apice articulati. *Perianthii* tubus 3·8–4·2 cm. longus, lobi 2·5–3·1 cm. longi, lineares, obtusi, albi.

British East Africa. Near Mazeras, *Powell* 12.

Described from a living plant, sent by Mr. H. Powell in 1906 to the Royal Botanic Gardens, Kew, where it flowered in Sept. 1909. According to Mr. Powell the plant is scarce.

1470. **Lipocarpha monocephala**, *Turrill* [Cyperaceae-Scirpoideae]; a speciebus omnibus adhuc descriptis spicis solitariis differt.

Herba annua, glabra, gracilis, usque ad 11 cm. alta. *Culmi* plures, teretes, laeves, inferne foliati, superne nudi. *Folia* linearia, acuta, 1–2 cm. longa, 0·5 mm. lata. *Spicae* solitariae, laterales, 4–6 mm. infra apicem positae, breviter conoideo-cylindricae, 2·5 mm. longae, 1·5 mm. diametro. *Glumae* late triangulares, apice minute apiculatae, 0·75 mm. longae, 0·75 mm. latae, costa alba excepta atrorubentes, glabrae. *Squamellae* 2, antice et postice dispositae, apice rotundatae vel obtusae, 0·75 mm. longae, 0·5 mm. latae, hyalinae. *Stamen* 1, anticum; filamentum 0·75 mm. longum; anthera conspicue apiculata, cum apiculo ei vix aequilongo fere 0·5 mm. longa. *Nux* obovoidea, 0·75 mm. longa, fere 0·5 mm. diametro, brunnea, laevis; stylus 0·4 mm. longus, profunde bifidus.

Tropical Africa. S. Rhodesia; Victoria Falls in the Rain Forest, *F. A. Rogers* 6024.

XLIX.—A DISEASE OF NARCISSUS BULBS.

(With Plate.)

G. Massee.

About three years ago a disease of an unusual nature was met with on various kinds of Narcissus bulbs. During the present season the disease has increased to such a serious extent, that according to the statement of growers on a large scale, entire plots of bulbs have been completely destroyed. The injury is due to the presence of a parasitic fungus called *Fusarium bulbigenum*, Cooke & Mass., first described in 1887, the host being given as a Narcissus bulb. At that time it was not recognised as a parasite.

As a rule the presence of the parasite is first indicated by the appearance of small, yellowish spots on the leaves. These spots gradually increase in size, become brown and dry, and become more or less covered with pale salmon-coloured specks, which are at first more or less gelatinous, but soon become dry and horny when exposed to the air. These coloured patches are masses of Fusarium spores, which are dispersed by various means and infect neighbouring plants. The mycelium present in the leaf can be traced passing downwards into the bulb, where it grows vigorously and spreads rapidly in the fleshy bulb-scales. During the early stage of infection of the bulb, the tips of the scales only are injured, as indicated by the brown colour, the injury, however, gradually extends to the base and enters the "cushion," from whence it spreads rapidly, and very soon the entire bulb is of a uniform brown colour. When this stage is reached the fungus forms delicate whitish sheets between the bulb-scales, and numerous chlamydospores or resting-spores are produced on the mycelium present in the substance of the scales. These spores are globose, colourless, with a thick cell-wall, and are produced at the tips of branches, or occur in chains in the length of the mycelium. They

vary from 10–14μ in diameter. The Fusarium spores are borne in clusters at the tips of short branches, and in the mass are tinged salmon-colour, but are colourless under the microscope, they are 3-septate, tips pointed and slightly curved. In size they vary from 40–50 × 5–6μ.

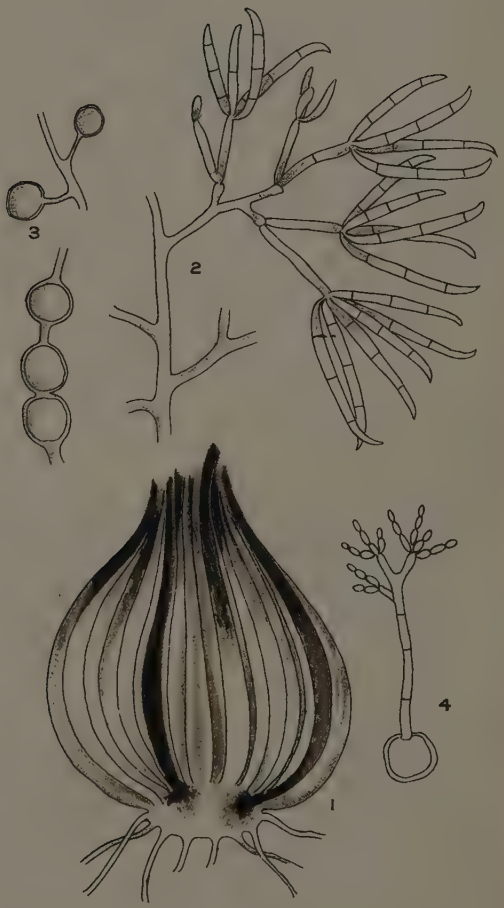
When a bulb becomes brown, it soon commences to decay, and its complete destruction is hastened by the attacks of various kinds of saprophytic fungi, *Penicillium*, &c., and by saprophytic eelworms, such as species of *Rhabdites*. When bulbs decay in this manner before lifting, as frequently happens, the soil becomes infected by the liberation of the chlamydospores, which infect future crops. The germinating chlamydospores emit one or two short slender branches, which bear a few short chains of minute, colourless, elliptical secondary-spores, measuring about 3 × 2μ. These minute spores are the first to infect Narcissus leaves in the spring, after which the disease is continued throughout the season by means of the Fusarium form of spore.

The young leaves of a Narcissus, about 1 in. long, were infected with Fusarium spores, and in six days yellowish spots appeared at the points of infection, and as the leaves continued to increase in length, other diseased spots appeared lower down the leaf, mycelium in all instances being present in abundance in the tissues a week after the infection period. It is highly probable that the first infection, by means of the minute secondary-spores produced by the chlamydospores, occurs when the leaves are quite young, and that the disease gradually descends to the base of the leaf and into the bulb, by a series of subsequent infections lower and lower down the leaf, due to independent infections by spores washed from diseased patches higher up the leaf. Chlamydospores are present in abundance in the tissues of the leaves.

The continuance of this disease may be due to two independent causes :—

(1.) Slightly diseased bulbs, containing the Fusarium spores or chlamydospores. Such bulbs are not readily detected when the injury is slight; however, when cut in two the presence of disease is readily indicated by the browning of the scales near the neck of the bulb. It is very doubtful whether soaking slightly diseased bulbs in a fungicide would kill the mycelium present; it certainly would not kill thick-walled chlamydospores or resting-spores.

(2.) Infected soil. Whenever a crop of diseased bulbs has occurred, it may be concluded with certainty that the soil is infected, due to the decay of bulbs before lifting, and to fallen diseased leaves, both of which contain chlamydospores in their tissues. So far as is known at present, the fungus has only been met with on Narcissus bulbs, but most probably in course of time, it will extend its ravages to other bulbous plants. Under the circumstances, the safest course would be to avoid planting bulbs for two or three years, on land that had produced a diseased crop. No kind of dressing would be likely to destroy the chlamydospores directly, but



A DISEASE OF NARCISSUS BULBS.

[To face page 309.]

during the spring, when they are germinating and producing secondary-spores, the latter would be killed by a dressing of kainit, or of sulphate of potash, lightly worked into the soil.

The disease is known in Holland, from where, quite unintentionally, the disease may often be re-introduced into this country by means of slightly infected bulbs.

Description of the Figures.

1. Section of Narcissus bulb, showing early stage of disease. Natural size.
2. Branched mycelium bearing clusters of Fusarium spores. × 400.
3. Chlamydospores or resting-spores. × 400.
4. Chlamydospores germinating and producing secondary spores. × 400.

L.—THE NATIONAL BOTANIC GARDEN OF SOUTH AFRICA.

After a lapse of over twenty-one years a Botanic Garden at the Cape is once again an established fact. The delay in the realisation of this important project is almost compensated for by the nature of the present achievement, and one need no longer regret the abandonment in 1892 of the ill-fated Cape Town Botanic Garden since a scheme for the establishment of a National Botanic Garden at Kirstenbosch is now being perfected, thoroughly worthy of a United South Africa.

The history of the founding of the original Cape Town Botanic Garden and of its transference to the Municipality has already been recorded in the pages of the *Bulletin*.* In a sense that garden has served its purpose and it has now become the pleasant and necessary public garden of the city. For a Botanic Garden the situation was undesirable and the area wholly inadequate. When to these serious drawbacks the impossible financial position is taken into consideration the existence of the Garden, botanic often little more than in name, for nearly forty-five years is a striking testimony to the pertinacity of a few devoted men actuated by a great ideal.

It must not be forgotten, however, before passing on to the consideration of the National Botanic Garden at Kirstenbosch that in Natal South Africa has possessed a Botanic Garden for over fifty years where the true functions of such an institution have been ably maintained in spite of many difficulties. It is a matter of regret that the area of this Garden is so small; but small though it be its maintenance is as important now as ever it was, and its activities must not be suffered to be curtailed or its functions abrogated owing to any change in its administration or to the establishment of the new National Garden.

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* *Kew Bulletin*, 1892, p. 11.

The need for provincial gardens like the one at Durban and for experimental botanic stations, which is now apparent and which was referred to by Professor Pearson in his presidential address before the South African Association for the Advancement of Science in 1910, will be even more keenly realised when the importance and possibilities of the National Garden come to be fully appreciated.

The choice of the Kirstenbosch Estate as the site for the National Botanic Garden was a particularly happy one and there can be no doubt that the selection of this site for the purpose would have met with the approval of Cecil Rhodes himself. The establishment of the Garden under such auspicious circumstances may therefore in large measure be regarded as an additional memorial to his wisdom and munificence.

The existence of so suitable a site for the garden as is this portion of the Rhodes Estate would, however, have been of little value but for the far-sightedness of General Botha and his Government in consequence of which the scheme has passed from the region of proposition and discussion into the realm of fact.

When the question of the establishment of a National Garden was prominently raised by Professor Pearson in 1910 proposals till then somewhat tentative and vague assumed a more definite character, and a meeting held in Cape Town on March 8th, 1912, under the presidency of Lord de Villiers, Chief Justice of South Africa, placed the matter on a practical basis. The object of the meeting was to advocate the formation of a National Botanical Society of South Africa whose ultimate aim should be the establishment of a National Botanic Garden. The resolution was moved by Professor Pearson and seconded by Dr. Marloth after the Chairman had warmly advocated the proposition in his opening remarks. Among those present were Mr. Arderne, who has frequently urged the need of an adequate Botanic Garden and to whose father the honour of the first suggestion of a Botanic Garden in 1847 is due; other representative people included Senator Schreiner, Sir Meiring Beck, the Rt. Hon. J. X. Merriman, the Mayor of Cape Town (Sir Frederick Smith), Mr. T. Bolus, Mr. E. Pillans and others.

The resolution was carried unanimously and a committee was formed to consider the formation of a National Botanical Society and to prepare the details of a scheme for the establishment of a National Botanic Garden within the peninsula.

The following were elected to serve on the committee: Lord de Villiers, Sir Meiring Beck, Mr. Pillans, Professor Pearson, Mr. Struben, Dr. Marloth, Mr. L. Mansergh, Miss Fairbridge, Mr. G. B. van Zyl, Mr. F. Cartwright, Mr. Ridley, Mr. Nash, Mr. Arderne and the Mayor of Cape Town, with power to add to their number.

A deputation representing this committee waited on the Prime Minister (General Botha) on April 4th, 1912, Mr. Malan, Minister of Education, being also present, and was sympathetically received. An estimate of the annual cost of the maintenance of a Botanic Garden and definite suggestions as to the nature of its control were asked for before any decision could be given by the Government. It was in the course of this interview that the suitability of the Kirstenbosch Estate for the purposes of a Botanic Garden was pointed out.

More than a year elapsed before the subject was further advanced. Sir Lionel Phillips, though unable to be present at the meeting held in March, 1912, had warmly espoused the cause which the advocates of a National Botanical Society had at heart and entered the field as the champion of the proposal to found a National Botanic Garden. On May 6th, 1913, he moved in the House of Assembly "that the Government should consider the advisability of setting aside a piece of ground at Kirstenbosch for the establishment of a National Botanic Garden." After an interesting debate which occupied some two hours, during which general support was given and considerable interest and enthusiasm was shown the motion was agreed to unanimously. That enthusiasm has carried the scheme to a successful issue.

The debate was followed by a deputation to the Prime Minister including members of both houses and of different political views which resulted in the formal approval of the scheme, the grant of the use of the Kirstenbosch Estate, and the placing of a vote on the supplementary estimates of the year.

The Government grant consists of £2500 for a Director's house and a small private Laboratory with an annual subsidy of £1000 a year which may be increased when plans are more definitely matured.

The establishment of a National Botanical Society to supplement the funds granted by the Government now became a necessity and on June 10th, the Mayor of Cape Town (Mr. Councillor H. Hands) presided over a large and influential meeting convened for the purpose of inaugurating the Society. Sir Lionel Phillips put the resolution to the meeting:—"That this meeting agrees to the formation of the National Botanical Society for the purpose of assisting in the establishment of a National Botanic Garden at Kirstenbosch, and for the encouragement of the growth of the South African flora." This resolution, and a further one relating to subscriptions, having been carried, Sir Lionel Phillips added that he had merely been an instrument, and that the initiative came from Professor Pearson, who would be the Honorary Director of the Garden.

The control of the Garden is to be exercised by a Board of five trustees, of whom three are nominated by Government, one by the Corporation of Cape Town, and one by the Botanical Society. Lord de Villiers, Sir David Graaff, and Sir Lionel Phillips have been appointed members of the Board by the Government, and the Mayor of Cape Town has been appointed a trustee by the Corporation.

The decision of the Government to establish the Garden having been reached, no time has been lost in putting the scheme into operation. Professor H. H. W. Pearson has been appointed Honorary Director, a position which he is admirably qualified to fill and one which could hardly be more fittingly bestowed when regard is had to the ardour and perseverance which he has displayed in helping to bring the Botanic Garden into being. Mr. J. W. Matthews, formerly at Kew (see *K. B.*, 1913, p. 278), has been appointed Curator, and work was actually commenced at Kirstenbosch on August 1st.

The following circular has been issued by the Honorary Director :—

"National Botanic Gardens, Kirstenbosch, Newlands, Cape.

"August, 1913.

"Dear Sir,

"You will be aware that the formation of a National Botanic Garden has been commenced on the Groote Schuur Estates, at Kirstenbosch.

"The main objects of the Garden are the preservation, cultivation and study of the native vegetation of South Africa. To this end, it is desired to establish at Kirstenbosch a large and representative collection of native plants. The educational and scientific value of such a collection in a place where it can be easily studied, not only by the large population residing in the vicinity, but also by very numerous visitors from all parts of South Africa and from oversea, can hardly be overestimated. It is therefore felt that the success of the National Botanic Gardens will be earnestly desired by those who appreciate the fact that the native vegetation of South Africa constitutes in many respects the most remarkable of the warm-temperate floras of the world.

"It is very desirable that no time should be lost in adding to the collection of living plants already established at Kirstenbosch. I am therefore authorised by the Trustees to invite your kind co-operation, in the hope that you will be able to contribute specimens from your neighbourhood.

"In general, it may be said that any South African plants will be gratefully received. In particular, it is desired to obtain *seeds*, *bulbs*, *corms* or other parts suitable for propagation, or complete living specimens of—

1. Plants remarkable for the beauty of their foliage or flowers, or for any other peculiarity.
2. Rare plants of all kinds.
3. Succulents.
4. Plants of known or supposed economic value—especially those used in medicine.
5. Grasses.
6. Trees and shrubs.
7. Climbing plants.
8. Ferns.
9. Cycads.

"Specimens may be sent free by rail if addressed :—

'Botanical Specimens.'
O.H.M.S.
The Director,
National Botanic Gardens,
Kirstenbosch,
Newlands, Cape.

"Trusting that you will be willing to assist us,
I am, dear Sir,
Yours faithfully,
H. H. W. Pearson,
Hon. Director."

The circular appears to have been promptly responded to. Professor Pearson writing to Sir William Thiselton-Dyer on August 12th says "People here are really proud of their flora . . . . Now that they see work [on the Botanic Garden] really in progress they are as keen as anyone could wish. Last night I received six great packages of aloes, bulbs and other things from a firm of merchants in Grahamstown, and when the enclosed circular (printed above) has been well distributed I do not doubt we shall be all but overwhelmed with material. The movement is extremely popular and I believe its popularity will last—some indications of this are really amusing. For example I was stopped by three separate station officials yesterday, to be told of the arrival of the six packages."

There can be no doubt that Professor Pearson is correct in saying that South Africans are proud of their flora, and it is well that they should be seeing that they live surrounded by some of the most remarkable types of vegetation in the world. It would be impossible to convey any impression of its richness in a short notice and one can only point to the evergrowing pages of the *Flora Capensis* as an indication of its wealth and diversity. The long list of collectors and travellers there enumerated bears ample testimony to the interest which has been aroused by the vegetation of the Cape peninsula and South Africa generally since the discovery of the Cape of Good Hope. A visit to many a European Botanic Garden and more particularly to Kew would probably be a striking object lesson to those in South Africa who have not fully realised the value and importance of their native flora.

Now that the South African Government with far-sighted wisdom have granted a well-nigh ideal site for the proper cultivation, among other things, of the native treasures of South Africa it will be possible for plants to be seen under their own sky which up to now it might have been easier to sail to England or to visit the Riviera in order to examine.

The site granted for the garden is a farm about 400 acres in extent on the eastern slopes of Table Mountain which has been neglected for some years. Though it is largely overgrown with poplars and pines there still exist on it specimens of nearly every native tree to be found in Southern Cape Colony west of the Knysna forests. The general situation of the garden is all that could be desired since it ranges in elevation from about 60–200 ft. in the eastern to about 1500 ft. in the western half. The soil is granite below with sandstone blocks at the higher levels, strewn over the surface from above, while near one boundary there is an outcrop of Malmesbury slates. The granite occupies some 200 acres and the land is slightly undulating. In many places there are extensive deposits of rich organic soil. A feature of very great importance is the presence of permanent water and there are two constant streams which will be of the utmost value for irrigation purposes, and will no doubt also be capable of effective treatment from the scenic point of view, especially as the gorges are richly wooded with native vegetation. There is also a heavy winter rainfall and the garden is practically completely sheltered from the drying south-east wind. In addition to these highly desirable qualifications for the purposes of a garden the site also commands a magnificent view eastwards over the Cape Flats.

Not only is there a rich flora of native trees but many mesembryanthemums, aloes and other succulents are to be found growing wild at Kirstenbosch and as the climate of the Cape Peninsula is one which is favourable to the growth of succulents it will no doubt be possible to build up an almost complete collection of the remarkable succulent flora of the Karoo, Namaqualand, &c., an achievement which alone might be held to justify the establishment of a National Botanic Garden in that Peninsula. (Further details as as the site, etc., are given in the article by Professor H. H. W. Pearson in Gardeners' Chronicle, August 30th, 1913, pp. 150–152.)

The Kirstenbosch site has the further and very important advantage that it is easily accessible, being about 1½ miles from the nearest station on the railway from Cape Town to Simonstown. A good motor road, completing Rhodes' scheme of a road round Table Mountain, passes through the estate and there is already a popular service of motor omnibuses using this route as far as it is open for traffic.

It is proposed to build the residence for the Director and the small Laboratory without delay, and as the Curator is already in office and labour appears to be available for clearing purposes it only remains for the people of South Africa adequately to finance the scheme.

The site selected would appear to be as favourable as could be wished, the native flora is one unique in its botanical and horticultural interest and the opportunities for scientific work likely to be beneficial to the country at large afforded by a Botanic Garden are very great. That the Government in granting the use of the Kirstenbosch Estate and in making a grant have responded nobly to the demand for a National Garden will be generally agreed, but unless adequate popular support be forthcoming a great opportunity may easily be lost.

The National Botanical Society of South Africa has set before itself a task of great importance and one which it may justly feel proud to have had entrusted to it. The botanical world is fortunate in possessing full confidence that the task so enthusiastically undertaken will be carried to a successful fulfilment and rejoices in the formation of the Society and in the establishment of the National Botanic Garden.

LI.—MISCELLANEOUS NOTES.

Mr. Humphrey Gilbert Carter, M.B., Ch.B. (Edin.), has been appointed by the Secretary of State for India in Council, on the recommendation of Kew, Economic Botanist to the Botanical Survey of India.

Mr. John Noel Milsum, a member of the gardening staff of the Royal Botanic Gardens, has been appointed by the Secretary of State for the Colonies, on the recommendation of Kew, an Assistant Superintendent of Government Plantations in the Federated Malay States in succession to Mr. J. G. Watson (*K. B.* 1913, p. 48) who has been transferred to the Forestry Department of the Federated Malay States.

Botanical Magazine for October.—The plants figured are *Stanhopea grandiflora*, Reichb. f. (t. 8517); *Rhododendron haematocheilum*, Craib (t. 8518); *Nautilocalyx pallidus*, Sprague (t. 8519); *Schizophragma hydrangeoides*, Sieb. et Zucc. (t. 8520) and *Streptocarpus cyaneus*, S. Moore (t. 8521).

The *Stanhopea* was originally described as long ago as 1805 by Humboldt and Bonpland, under the generic name of *Epidendrum*, from specimens collected near Cuenca, Ecuador. Some confusion has arisen owing to a variety of *S. eburnea* having been named *S. grandiflora* by Lindley. Further material of the true *S. grandiflora* was collected at Cuenca and a coloured sketch was made by Mr. Consul Lehmann, whose collections are now at Kew. The figure was prepared from a plant which flowered in 1912 in Sir Frank Crisp's collection at Friar Park, Henley.

Rhododendron haematocheilum is one of the Chinese species raised by Messrs. J. Veitch & Sons from seed collected by Mr. E. H. Wilson. The plant resembles *R. Davidii* but is easily distinguished by its much less elongated inflorescence and by the glabrous, smooth ovary and style. *R. Fargesii*, Franch. and *R. Sheltonae*, Hems. and E. H. Wils. are probably its nearest allies. The corolla is at first blood-red in colour and fades to a rich carmine.

The Gesneraceous plant which forms the subject of the next illustration belongs to a very natural group of species formerly referred in part to *Episcia* and in part to *Alloplectus* and now brought together under the old name *Nautilocalyx*. *N. pallidus* is a native of Peru where it was collected by Mr. Forget for Messrs. F. Sander & Sons, St. Albans, to whom we are indebted for the plant from which the figure was made. Two other species of this genus *N. Lynchii* and *N. bullatus* are also in cultivation.

The name *Schizophragma hydrangeoides* has been erroneously applied for a couple of generations to *Hydrangea petiolaris*, Sieb. and Zucc., an allied Japanese shrub which is easily distinguished by its sterile flowers with four segments, whilst in *Schizophragma* the sterile flowers have but a single bract. The true *S. hydrangeoides*, however, is a comparatively recent introduction to British gardens and the first recorded blossoming appears to have been in 1905 in the garden of the late Mr. B. E. Chambers of Grayswood, Haslemere. The spray figured was sent to Kew by Miss Willmott, Warley Place.

The *Streptocarpus* is closely allied to the well-known *S. Rexii*, Lindl., but differs in the shorter and relatively more dilated corolla tube. Mr. E. E. Galpin found *S. cyaneus* in wooded kloofs near Barberton in 1891, but the description of the species was based on specimens collected by Mr. J. Burtt Davy at Forbes Reef Bush, Swaziland, in 1905. The specimen figured was raised from seed collected by Mr. Thorncroft near Barberton and presented to Kew by Mr. W. E. Ledger, of Wimbledon. The flowers are very pleasing and vary in colour from pale lavender or blue to rosy mauve, with a few streaks of red on the three lower lobes and a blotch of yellow in the corolla tube.

Mr. Allard's Arboretum at Angers.—At La Maulévrie, in the suburbs of Angers, is situated one of the finest collections of hardy trees and shrubs in France. It belongs to Mr. G. Allard and has been formed entirely by him. The inauguration of the Arboretum dates back as far as 1858, when the site was drained and the soil treated; the first plantings, however, were not made until 1863, after which, for over thirty years, Mr. Allard was occupied in forming the main collections. Their augmentation has been assiduously carried on up to the present. The area occupied is about 17½ acres, and the number of species and varieties represented there is over two thousand. The collection is particularly noteworthy for the splendid series of conifers and oaks: of the former there are about 260 species and varieties, and of the oaks there are about half as many. The Arboretum, moreover, is not more remarkable for its comprehensiveness than for the size, health and arrangement of the individual specimens. At the present time it affords probably the best object-lesson available to planters in the west of France for the adornment of their gardens and parks. It is a remarkable example, too, of what may be accomplished in the lifetime of one man, with the enthusiasm and ability such as Mr. Allard possesses.

In the course of an official visit in company with Sir F. W. Moore of Glasnevin, I spent June 11 and 12 last inspecting the Arboretum. Two days were far from exhausting its interest. Many conifers and hardwoods thrive there that are only to be found in good condition in the mildest parts of the British Isles. *Athrotaxis selaginoides*, for instance, is 15 ft. high, and *A. cupressoides* 7 ft.; the rare *Libocedrus tetragona* is 9 ft. high. The tender cypresses such as *Cupressus cashmeriana*, *C. torulosa*, *C. funebris*, etc., are all very healthy, and, owing no doubt to the sunny climate, bear cones in remarkable freedom. Angers is on an angle of land formed by the confluence of the rivers Loire and Maine which are considered to have an alleviating influence on the climate. *Styrax officinalis*, 15 ft. high and in flower; *Diospyros Kaki*, 35 ft. high, with a trunk 10 ins. in diameter; *Leptospermum scoparium*, 9 ft. high, blossoming freely; *Fabiana imbricata*, 12 ft. high; and *Illicium religiosum*, 10 ft. high, all bear testimony in its favour.

A tree of peculiar interest is *Populus euphratica*, 18 ft. high, its trunk 5 ins. thick, its foliage very glaucous and Eucalyptus-like. This is the real weeping "willow" that grew by the waters of Babylon, of which the Psalmist wrote. Mr. Allard has what is probably the most remarkable example of the weeping variety of *Sequoia gigantea* in existence. This extraordinary tree is a slender spire 65 ft. high; to its trunk, which is 15 ins. in diameter, the almost vertically hanging branches are so closely pressed that the whole tree is only some 6 ft. in spread at the base. Of similar outline is *Abies Pinsapo pendula*, 24 ft. high and 4 ft. wide at the base.

It was a pleasure to see a healthy specimen of the rare *Pinus Torreyana*, 30 ft. high; this pine, one of the 5-leaved species, too tender for most parts of Britain, is confined in a wild state to two small areas in California. *Ilex cornuta*, of which the Arboretum has many examples, is as ornamental in fruit as the common holly with us, and birds do not eat the fruit. The new *Actinidia chinensis* was flowering freely on a wall. Of the true pitch pine of the S.E.

United States (*P. palustris*), the only specimen of which at Kew was broken by the storm of March 22 last, Mr. Allard has one 10 ft. high, much more branched than was the Kew tree. *Torreya nucifera*, bearing fruit freely, is a clean-grown small tree with a trunk 8 ins. thick.

If the opportunity should occur, the city of Angers would do well to seize the chance of acquiring one of the finest collections of woody plants in existence. As far as municipal arboretums are concerned, it would possess one second to none, unless it were that maintained with such liberality by the City of Rochester in New York State.

W. J. B.

Nomenclature of Visenia.—An enquiry has recently been made at Kew respecting the authorship of the names *Visenia indica* and *Melochia indica*, the former of which is usually attributed to Houttyn and the latter to Asa Gray.

It appears that no such name as *Visenia indica* was ever published by Houttyn. He established the genus in "Handleiding," vol. viii. (1777), p. 309, the only species given there being *V. umbellata*. This "Handleiding" is "Deel 11, Planten" (14 vol. 1774–1783) of Houttyn's "Natuurlyke Historie . . . volgens het Samenstel van den Heer Linnaeus" and was also issued separately as "Handleiding tot de Plant-en Kruitkundl etc."

J. F. Gmelin in his edition of Linnaeus' "Syst. Nat." vol. ii. (1791), p. 515, has under *Wisenia* "indica. l. Wisenia. Houttugm. Linn. Pflanzensyst. 6. p. 287, t. 46. f. 3."

The publication Gmelin refers to is Christmann and Panzer's German edition of Houttyn's work vol. vi. of which is dated 1780. There the name is spelt *Visenia* and the only species given under *Visenia* is *V. umbellata*. It is perfectly clear that J. F. Gmelin is responsible for the name '*indica*' and the spelling *Wisenia*, and there is little doubt that he meant by *Wisenia indica* the plant which Houttyn called *Visenia umbellata*, but he never gave a description of it. Hasskarl in Tijdschr. Natuurl. Geschied. vol xii. (1845), p. 122, seems to have been the first to attribute the combination *Visenia indica* to "Houtt." quoting "*V. umbellata*, Bl. Bijdr. 88" as a synonym of it. He repeated it in "Plantae Javanicae" whence it passed into Miquel, "Fl. Ind. Bat." vol. 1. ii. p. 189, and other works.

As to '*Melochia indica*,' A. Gray, the first reference to it is by K. Schumann in Engl. Bot. Jahrb. xi (1888), p. 209. However A. Gray did not make that combination although he pointed out that "*Visenia* cannot be generically distinguished from *Melochia*" (Wilk. Exped. Bot. i. (1854), 193). K. Schumann's reference to Miquel on one side and to A. Gray on the other makes it perfectly clear that he considered A. Gray as responsible for all the new combinations arising out of the reduction of *Visenia* to *Melochia*, hence *Visenia indica*, Houtt. (ex Miquel): *Melochia indica* (Houtt.) A. Gray. The earliest specific name for the plant in question is "*umbellata*" and the correct combination under *Melochia* should therefore be *M. umbellata*.

O. S.

Trees and Shrubs, Vol. ii., part iv.—We have received the fourth, and concluding, part of the second volume of Professor Sargent's publication. It contains twenty-five plates by Mr. C. E. Faxon and accompanying letterpress by the editor and Mr. Alfred Rehder. Mr. Faxon's drawings show, as usual, his admirable faculty of bringing out the salient characters of his subject with greatest economy of line; and the descriptions and notes reveal all the care and thoroughness that characterise their respective authors. The printing and paper are of the highest quality and the part as a whole maintains the high standard we have learned to expect in works emanating from the Arnold Arboretum. This publication, the only periodical in English devoted exclusively to the botanical consideration of ligneous plants, has now issued 200 plates. It is valuable not only for its illustrations and the text specially pertaining to them, but also for the frequent reviews and analytical keys of genera and geographical groups of trees and shrubs. In previous issues the Asiatic maples and Viburnums, the Phellodendrons, and the *Parthenocissus* group of *Vitis* have been exhaustively dealt with. In the present part Prof. Sargent gives five plates of American species of *Æsculus* with descriptions of three new species and a critical review of the whole group of American Pavias.

To those who have had to do with the hickories it has long been evident that there are, wild in the United States, numerous forms which could not reasonably be assigned to any of the described species. Prof. Sargent now descibes three new species and several new varieties and hybrids. It is interesting to see that after adopting *Hicoria* in place of the more general *Carya* as the generic term for the hickories in the *Silva of North America* and in the *Manual of the Trees of North America*, Prof. Sargent has now reverted to the older and commoner usage. The reason for the change does not appear to be given, but one welcomes it.

Thrinax Wendlandiana, a new palm inhabiting marshy lands in Florida and Cuba, originally described by Beccari in *Webbia*, ii., p. 265, is figured. Twenty-seven new species of *Crataegus* are described, two of them illustrated by plates.

A review of the interesting group of crabs belonging to the *Coronariae* section of *Malus* is published, and two new species are described by Mr. Rehder. It now appears that the *Pyrus angustifolia* of Aiton is identical with the tree previously named *P. coronaria* by Linnaeus, thus leaving the tree so long grown in gardens under the latter name without one. Mr. Rehder has named it *Malus fragrans*. The narrow-leaved glabrous tree we have so long known as *P. angustifolia* becomes *Malus* (or *Pyrus*) *coronaria*. This species, however, being rather tender is not frequent in English gardens, but it has lately been added to the Kew collection. The name of a third species, *ioensis*, which has become popular in its double-flowered forms in recent years, stands. The typical form has recently been figured in the Botanical Magazine t. 8488.